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i. Executive Summary

Eva Shitaatala & Associate Consultants were commissioned by Mr Rasmussen to do an environmental impact assessment for a lodge situated near the Okavango River in Shitemo Village since April 2016. A first site visit was conducted on 23 April 2016 and a public hearing with stakeholders and community representatives on the 29th of June 2016. Additional background information was collected and research on the project parameters and on the natural and social environment done July – August and a draft submitted to the Proponent on 15 September 2016 and amendments made subsequently.

The envisaged operation is one of comparatively moderate size and effort, with five planned bungalows, accommodating each two to four guests, camp sites for at maximum fifteen visitors and a moderate house for key staff and management. However, due to the probable locality within 100m proximity to the Kavango river special consideration had to be given to waste management and application for vegetation clearance licence and for permission to erect building structure, provision for autonomous sewerage management systems and an incinerator for non-degradable waste. Whilst the area has a high influx of human life and movement, it also offers habitat for selected wildlife and protected flora – an item that requires special attention in particular during construction and decommissioning.

Whilst detailed architectural plans do not exist at this point in time these will be eventually submitted to the relevant authorities and aligned to the Shitemo village's infrastructure and development plans. The planned development enhances economic development in the form of eco-tourism and will contribute to creating employment and potentially engage locals in self-help projects in the areas of agriculture and crafts.

The scope of works entails the upgrading of existing infrastructure, construction of septic tank, landscaping as well as electricity supply. Land/ground survey studies and public consultation were conducted through a public meeting and newspaper advertisements. Legislative considerations were incorporated under in section 33 and 35 of Environmental Management Act of 2007 and section 7,8,15, 22, 23 and 24 of Environmental Impact Assessment Regulation of 2012. Section 21 (1) under the Forest Act 2004 was also considered for provision to erect structure with 100m proximity from the river. Environmental impacts pressing to the existing environment were identified. Measures to control and managed the impacts were also identified and summarized in a form of a plan.

1 Chapter One: Background

1.1 Introduction

Tourism in Namibia is a major industry contributing to over N$ 7 billion of the national Gross Domestic Product (GDP). Over one million tourists visit the country annually seeking resorts and destinations that are pristine and close to the African culture. Tourism in Namibia thrives around centres with proven historic or natural attraction whilst there is a demand for development of tourist destinations across the country and in remoter areas. Any new tourism and resorts establishment within a booming industry leads to additional job creation. According to the Namibia Tourism Board (NTB, 2015), Tourism in Namibia has had a positive impact on resource conservation and rural development, with over 50 conservancies established, covering over 10 million hectares and contribution to above 18% of all formal jobs. Tourism along the pristine Okavango River has traditionally been adversely affected by historical war activities in Angola; The Kavango region meanwhile reports an increasing number of tourists to its numerous conservancies and game parks (Khaudum and Bwabwata).

Mr. Michael Rasmussen (herein referred to as the proponent) intends to promote eco-tourism in Namibia and establish a moderately sized lodge with bungalows and camping sites. In doing so the proponent hopes to resuscitate an old lodge and camp site run by his family before the Angolan civil war and which they had to abandon with the spill over of war activities into Namibia in 2000.

The Gciriku Traditional Authority have granted the proponent possession of the land over the coming twenty five years with the provision that the land is being used for the benefit of the community as stipulated in the consent letter granted and in line with the proponents proposal to establish a lodge.

1.2 Project Location

The proposed King Nangara Lodge borders with the Okavango river inside the Shitemo village in Kavango East and approximately 70km east of Rundu along the Rundu-Divundu highway. From the Shitemo village turnoff on that road it lies another 7km in north-eastern direction. The exact site is being defined by seven GPS point as indicated in the above figure and has a total size of 14 hectares. The land in question is under administration of the Gciriku Traditional Authority. The relevant GPS points are (starting at the left bottom and moving anti clockwise around the plot):

Table 1: Site Coordinates

A. S -17.984446 E 20.57181	B. S -17.981214 E 20.576813	C. S -17.979914E 20.576086
D. S -17.979981 E 20.575103	E. S -17.97898 E 20.574633	F.S -17.981009 E 20.572953

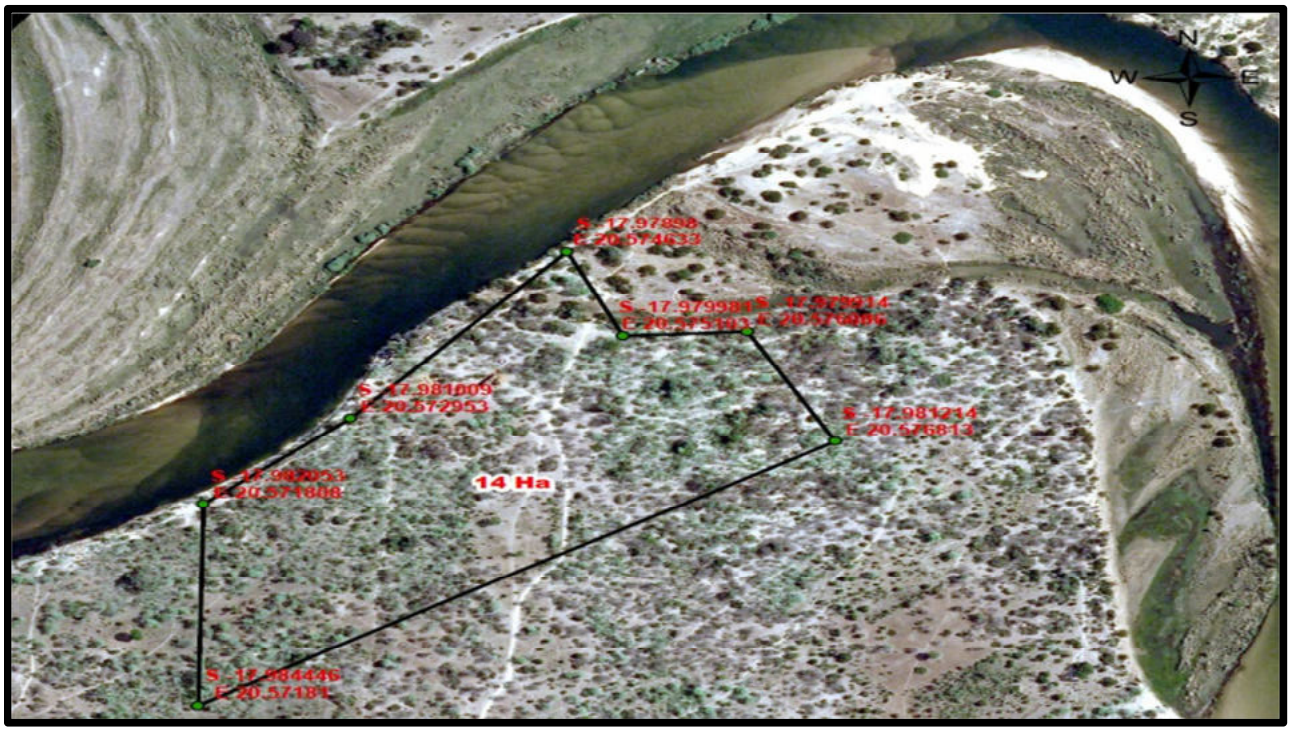

Figure 1: King Nangara lodge proposed site as indicated in size and coordination: source: Ministry of Land and Resettlement (2015)

1.3 Project Scope

1.3.1 Project Description

The project proponent proposes to resuscitate an old lodge and camp site that he and his family operated pre 2000. The proponent aims to promote environmental education, conservation and tourism in the heart of a rural community. Various scopes of activities were discussed during meetings of the proponent with the community and the Village Development Committee (VDC). Initial approval was granted by the above for a moderate accommodation establishment to be erected to house groups of roughly twenty tourists at a time and with a small kitchen and bar facilities provided for house guests – an allowing for self-catering tourists who make use of designated braai areas. The project shall start with the construction of the basic facilities such as ablution facilities, water supply and storeroom. There will be planting of lawns for camping sites and construction of accommodation facilities.

Potential flooding of the area will have a bearing on the architectural design and engineering of facilities. Wood and straw as well as other matter available in the area are the preferred building materials. Efforts will be taken to identify all the expected impacts of the entire proposed project.

1.3.2 Services and Infrastructure

The following structures are planned

- 5 Accommodation units for 2 to 4 people each
- 1 Braai and bar area
- 1 House (app 80 m^2) for management and staff
- Camp Sites for 15 people at maximum
- Small kitchen with restaurant and bar facilities
- Parking areas for five to eight vehicles at a time

During construction limited land will be required to be cleared, water pipelines laid and a gravel road constructed to connect the national road (B8) with the site. An electrical connection will be established from a nearby existing NORED transformer at a distance of approximately 3km from the lodge. A permit (Forest Act, 12 (Act 12 of 2001)) will be require for land clearing and the permit conditions will stipulate what to be done with the removed vegetation. All supporting linear infrastructure (road, water pipeline and electricity) will follow the same access line to minimize potential negative environmental impacts. There will be a micro incinerator on site to burn non-recyclable materials and a Biorock sewage system(See waste management plan) will be installed to treat the effluent and sewage discharge from the lodge (It`s philosophy enhances and combines the principles of primary separation-septic tank and aerobic biological filtration -conventional trickling filters).

1.4 Project Objectives

The proponent hopes to attract local and international visitors through the accommodation establishment and to promote environmental education, conservation and tourism in general in the rural community. A secondary objective the promotion of eco-tourism in the region and to boost local small scale economic activities (e.g. create markets for crafts and agricultural goods.).

1.5 Objective of this Study

This Environmental Impact Assessment is being undertaken to comply with the Environmental Management Act No.7 of 2007 and related Environmental Impact Assessment Regulations (GN 30 in GG 4878 of 6 February 2012). The main objectives of this study are

- To identify potential adverse impacts of the project and recommend mitigation measures as a means of protecting the environment;
    - To brief the Project Proponent on the legal requirements and a policy framework governing the proposed activity;
    - To identify potential changes to the local bio-diversity index that might result from Project implementation;
    - To reflect on the various public concerns which will help the relevant authorities and stakeholders to formulate informed decisions;
    - To come up with preventive and precautionary measures to limit the expected physical and biological environmental impacts associated with the proposed activities;
    - To develop an effective environmental management plan accompanying the normal lodge activities and regulating the preparatory, the operational and the decommissioning phases.

1.6 1.6 Terms of reference

The Environmental Impact Assessment requires a comprehensive evaluation of the project including inter alia:

- A complete description of the existing site proposed for development;
- Significant environmental issues of concern based on the baseline data compiled by the EIA Team, taking into consideration social, cultural and heritage related information;
- An assessment of the public perception on the proposed development
- Identification of policies, legislations and regulations relevant to the project;
- Determine the proposed short, medium and long term, direct, indirect and cumulative impacts of the development on the environment, and establish their respective relevant for the design of the development's facilities;
- Identification of mitigative actions together with the associated costs where practical;
- Conclusions and recommendations for the project proponent in an advisory capacity.

1.7 Environmental Assessment Team

The authors of this EIA report are Ms. Eva Shitaatala (Lead Consultant) and associate consultants: Mr. Evidence T. Kasinganeti and Mr. Gabriel Joseph. The team holds environmental qualifications relevant for this study as indicated in their resume attached. Ms Shitaatala and Mr Kasinganeti have both been engaged in environmental consulting such as conducting environmental impact assessments and developing environmental Management plans. Furthermore the team have research skills related to environmental management which are published. Attached in the appendix are the consultants CV for further details.

1.8 Assumptions and Limitations

All information received from sources related to this project will be considered consciously and reasonably. The intended activities forming part of the proponent's proposal will be assumed to bear fruit as part of the suggested developmental approach. Further assumptions will only be made where the information received and evaluated is sufficient and reliable.

1.9 Methodology and Approach

This EIA will be undertaken complying with the Environmental Management Act No.7 of 2007and the Environmental Impact Assessment Regulations (GN 30 in GG 4878 of 6 February 2012), as well as other Namibian environmental legislation and the EIA World Bank Standards (2010)

Scoping

- Identification of the interested and affected parties (I&APs);
- Announcement of the EIA process / registration of I&APs;
- Distribution of the background information document (BID);
- Public and stakeholder consultation
- Review of the environmental, social and economic aspects taking into consideration applicable policies and regulations;
- Preparation of a draft Scoping Report;
- Public review of the draft Scoping Report; and
- Incorporating of public comments, preparation of a final scoping report and submission to the MET.

Assessment of Impacts

- An impact assessment matrix is applied to determine potential environmental risks of the project,

- Mitigation protocols are established
- A draft EIA Report and Environmental Management Plan is produced;
- Public review of draft EIA and EMP is facilitated;
- Thereafter the final EIA and EMP is submitted to the Ministry of Environment and Tourism;
- Pending a decision formulated by the authorities, this is communicated to I& APs and opportunity to appeal granted.

1.10 Impact Assessment and Evaluation

An impact is any adjustment to the prevailing situation or state of the environment caused by human activity or by external influences. Impacts can be of positive (beneficial) or negative (adverse) nature. Impacts are further classified to be direct or indirect, long-term or short-term, locally confined or broad. Impacts are termed cumulative that incremental or intensify existing impacts. Impacts may be the result of site preparation, project implementation, or decommissioning.

The main potential impacts are:

- Change of land use parameters and diminution of vegetation;
- Potential fire outbreaks;
- Employment creation for local residents.
- Occupational risks during construction
- Bearing on local fauna
- Bearing on local water quality and supply

2 Chapter Two: Policy, Legal and Administrative Framework

2.1 Introduction

An important component of the EIA is the identification and review of the administrative, policy and legislative framework concerning the proposed activity. The main purpose is to inform the proponent about the requirements to be fulfilled, when undertaking a touristic activity as intended. This review focuses on compliance with national and international legislation as far as planning, operational and decommissioning phases of the project are concerned. All applicable policy, legislative and other conditions will guide the proponent at implementing the project in accordance with best practices and environmental management requirements.

The Namibian Environmental Management Act 7 of 2007 is a central legislation guiding environmental assessment in Namibia. The Act provides a definition of the term "environment" as "the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including (a) the natural environment, that is the land, water and air, all organic and inorganic material and all living organisms; and (b) the human environment, that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values".

The regulations based upon the act were laid down in 2012 and provide for principles of environmental protection and remediation. They further lay down the duties, roles and powers assigned to authorities as far as environmental management and, in particular, environmental assessments are concerned. The environmental management regulations authorise the environmental commissioner to list and de-list activities requiring an EIA and specify the processes to be followed by proponents for different projects/developments. The regulations provide environmental assessment practitioners and environmental officers with clear criteria – also as regards the eligibility of those involved. In both the environmental management act and above mentioned regulations categories of activities that may not be undertaken without an environmental clearance certificate are listed. The proposed King Nangara venture involves the building and operation of a lodge, which as such is listed as touristic activity requiring above mentioned clearance. It is stipulated in the act that prospective cumulative impacts associated with the project should be assessed in public consultation. The act further requires the proponent to prepare a waste management plan and present such to the local authorities for approval.

Furthermore, Namibia is a signatory to and has adopted international environmental treaties, such as the Convention on Biological Diversity, the United Nations Convection to Combat Desertification, the United Nations Framework Convention on Climate Change and Agenda 21. In the following – all legal conditions and requirements relevant to the project are highlighted and brought into context and recommendations are

being offered as to what provisions should be made in order to comply. Supplementary to the legislation below consideration to the following environmental legislation were also considered. The proponent commit to promote sustainable development, manage natural resources and preserve monuments identified on site. Therefore throughout operation, the proponent will observe following legislation:

1. Article 91 (c) and 95 (i) of the Constitution of the Republic of Namibia.
2. Chapter 4 of Labour Act**,** 11 of 2007**.**
3. Section 25 of National Heritage Act 27 of 2004.
4. National Tourism Policy
5. Human wildlife conflict Policy, 2009.
6. National Drought Policy and Strategy

Table 2: Applicable Policies, Legal and Administrative Regulations

Legislation/Policy/Guiding Document	Provision	Applicability and Recommendations
Communal Land Act 5 of 2002	This act makes provision for land allocation in communal area.	The land in question was allocated to the proponent in accordance with section 20 by the traditional authority for the purpose of construction and operation of a lodge under the provision of section 30.
Environmental Management Act No. 07 of 2007	The act aims at promoting sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment. It provides for a process of assessment and control of projects that may have significant effects on the environment as well as for incidental matters. Finally, the act lays down procedures for adequate public participation during the environmental assessment process.	All formal requirements stated in the act will be duly identified and adhered to. The public participation process is covered and outcomes and further details are presented in chapter 4. Whilst, the impacts mitigation measures addressed and covered in chapter 5 and 6.
Soil Conservation Act 76 of 1969	This acts makes provision for combating and for the prevention of soil erosion, it promotes	The Project will have a limited impact on the locality of the envisaged structures and surrounding as regards the existing

	the conservation, protection and improvement of the soil, vegetation, sources and resources of the Republic of Namibia.	soil and vegetation. Reforestation of parts of the cleared vegetation will be considered.
Nature Conservation Ordinance 1996	This ordinance relates to the conservation of nature; the establishment of game, parks and nature reserves; the control of problem animals; and highlights matters incidental thereto.	The proposed project lies outside demarcated conservation areas, national parks or other specially protected environments. The plan is to fence off the lodge to prevent buffalos or hippos to enter from the Northern side (the river and neighbouring Cubango, Angola, and Elephants that may be astray in the area from conservancies at a distance of approximately 45 km (Mahango Park)
Protected Areas and Wildlife Management Bill	This bill embraces biological diversity and regulates the maintenance and, caters for rehabilitation and guards essential ecological processes and life support systems are maintained. It protects indigenous species of fauna and flora and prohibits / prevents exploitation.	Land clearing will be done in consultation with forestry department to avoid cutting down of protected trees such as Digitatia eriantha, Acacia erioloba, colophosperum mopane and peltophorum africanum. Precaution for reptiles' protection will be employed. See chapter 6
Forest Act, 2001 (Act No. 12 of 2001)	The Act makes provision for the protection of various plant species). This act is also aimed to control the structure erection near protected areas.	The lodge is about 14 hectares. No land clearance permit required except permit for construction activities near the river and road upgrading as refered in Section 21 (3), 22(3) and 30 (a).

National Rangeland Policy and Strategy, 2012	The policy encourages resource users (farmers and managers) to manage their rangeland resources in a sustainable, economically viable, socially acceptable, environmentally friendly and politically conducive manner.	The project will positively impact the social environment through job creation and other aspects of development for the community like providing new markets for their craft and other products.
National Biodiversity Strategy and Action Plan (NBSAP2)	The action plan was operationalised in a bid to make aware the critical importance of biodiversity conservation in Namibia, putting together management of matters to do with ecosystems protection, biosafety, and biosystematics protection on both terrestrial and aquatic systems.	Acute and long term, ways to sustain the local biodiversity will be considered. Particularly during construction of access roads and of the lodge itself impact by heavy machinery will be curbed and the bearings of traffic will be reduced through regulations prescribed and monitored by the proponent.
National Policy on Climate Change for Namibia, 2010	This policy pursues the strengthening of national capacities to reduce climate change risk and build resilience for any climate change shocks.	The proposed project will promote eco-tourism while ensuring limited release of greenhouse gasses such as methane (septic tanks), carbon dioxide (vehicles & burning of plants during clearance). Proponent will be advised to consider reforestation and methane capturing.
Wetland Policy, 2004	The policy provides a platform for the conservation and wise use of wetlands, thus promoting inter-generational equity regarding wetland resource utilization.	The project proponent recognises the significance of close proximity to the Kavango river. The project envisage integrate water resource conservancy and plan create public awareness, limit excessive abstraction of river water and

		minimize water pollution on site, Proper lining of the septic tank is advised and approval for the plan should be obtained from the local authority to warrant proper construction.
Water Resources Management Act, 2013 (Act No. 11 of 2013)	This Act provides for the management, protection, development, use and conservation of water resources and the regulation and monitoring of water services and for incidental matters. (Department of Water Affairs).	The water utility purposed for this project lies within the parameters of domestic use such as cooking, bathing and toilet as per this Act (section 38) provided abstraction limits from the river are being maintained. Treated effluents will be used for gardening. Consideration of water harvesting and abstraction during and outside rainy season will be recommended in accordance with section 39 of the Act.
Pollution Control and Waste Management Bill	The bill aims to "prevent and regulate the discharge of pollutants into the air, water and land". Whilst the bill has not come into legal force it will be considered as if it were – since it regulates matters relevant in the context of eco-tourism.	Waste generated by the project will be handled according to section 55 (1) of the bill. Provision to dump waste in the river will be done in accordance with section 21 provisions. A contingence plan will be developed for the Septic tank to minimize ground water pollution. See also reference hereto in chapter 6 (EMP)

3 Chapter Three: Current Environmental and Social Set Up

3.1 Introduction

The findings in this chapter are based on baseline surveys, public consultation and desk reviews undertaken by the EIA team. The findings relate mainly to aspects of ecology, ambient air, soil, water and noise levels for the entire operation. Also the economic and social environment was considered for the purpose of this study.

3.2 Socio-Economic Status

The entire Kavango region (including Shitemo Village) ranks amongst the poorest regions in the country with a prevailing high unemployment rate. Shitemo village forms part of Ndonga Linena constituency which is dominated by Gciriku people. The villagers speaks Gciriku as the main their ruKavango language. Approximately there are about thirty (30) small rural homesteads along the Okavango river within the proximity of the planned project. The main sources of income include agriculture, forestry and fishing with agriculture as the dominant income source and livelihood generating sector. Main agriculture activities are small scale crop farming (53%)-growing Mahangu, livestock (23%) –farming goats and cattles, and poultry farming (8%) (Enviro Dynamic 2014). These farming systems provide a degree of food self-sufficiency with a few provision of economic development. In the further vicinity of the proposed development lie the small-scale commercial farms of 2 500 hectares which were allocated to individuals under a leasehold system. However, most of the crop-growing activities on these farms generate little income because fields are small, soils have limited fertility, yields are low, surplus harvests are rare and markets are small (Mendelsohn and El Obeid 2003: 92ff Brown 2010: 25).

The Okavango River is for many the only source of water and inhabitants depend on the river for food (fish) and also building materials such as reeds and sand from islands in the river. West of the proposed project site lies a rich floodplain which hosts the Ndonga Linena irrigation scheme that employs locals and serves as is an important source income. Vegetables such as cabbage, onions, tomatoes etc. are grown there. The Shitemo village also has a school and clinic. As for other services such as banking, shopping etc, villagers have to travel to Rundu.

The Gciriku people's social fibre is matrilineal structure with important duties inside the family mainly performed by relatives of the female lineage or 'clan. Clans have members who can trace their common origin many years back without assuming territorial, political or religious influence. The head of the clan is referred to as Hompa or vaHompa and serves as traditional leader. Today

this tradition still performs a crucial role both politically and socially in the community. To date the village is headed by a representative of the Hompa under the Gciriku traditional authority.

3.3 Climate

The Shitemo village is subjected to a humid subtropical climate, with hot summers and mild winters. During the austral winter, the days are warm and nights cool to cold. The annual rainfall ranges between 500 to550mm with June normally reporting the lowest and January the highest (Mendelsohn et al., 2002). During the high rainy season the area regularly becomes flooded which renders the land around the project site inaccessible for a period of two to four months January through March; very limited tourists movement in the region during this time. Daytime temperatures exceed 30□C throughout the year, except during May, June and July. Average maximum temperatures fluctuate between 32□C and 34□C and average minimum temperatures between 8□C and 10□C. The average level of humidity ranges from 10 to 20% during winter with the highest humidity normally recorded in March (70-80%).

3.4 Biological Environment

3.4.1 Flora

Along the Okavango River there prevails a high to very high vegetation density of considerable diversity. However, as a result of grazing it has been reduced considerably. The further inland is more densely vegetated and is prone to bush fires.

Plant species in the area form part of the extensive Kalahari sand basin which is characterized by grassland and encompassing plant species such as Vossia Cuspidata, Cynodon Dactylon and Setaria Sphacelata (Burke, 2002 – see figure 2 hereunder). Surrounding the site there are species such as kiaat, mopane, mangetti, blue sourplum, bird plum, baobabs, jackal berry and monkey oranges as summarised in the table 2 below. Amongst these species, four are amongst the main protected species namely *Digitaria eriantha, Acacia Erioloba, Colophospermum mopane and Peltophorum africanum.* The plant species found in this area bear significant economic value with false kiaat, mopane and ushsivi used for timber and the mangetti used to produce kashipembe liquor, (Mendelsohn & el Obeid, 2006).

During previous occupancy at the proposed site, trees were planted, ranging from African wattle (Acacia mearnssi), Knobthorn (Senegalia nigrescens), Jackalberry (Diospyros mespiliformis) and Camelthorn (Vachellia erioloba) and now form part of the prevalent vegetation.

Table 3: Common Plant Species occurring on the project area

Specie	Status
Anthephora pubescens,	
Brachiaria nigropedata,	
Digitaria eriantha	Protected
Acacia Erioloba	Protected
Hyphaene petersiana	
Colophospermum mopane	Protected
Terminalia prunioides	
Peltophorum africanum	Protected
Combretum imberbe	
Terminalia sericea	
Bauhinia petersiana	

Figure 2: Some of the vegetation at the proposed site

3.5 Fauna

The wildlife around the site comprises birds, reptiles and amphibians with a limited number of mammals. Reduced vegetation around the project site and surrounding environs has resulted in habitat loss for most mammals that used to habit the area. Human wildlife conflict (over utilization and habit destruction) has also contributed to forced animal movement to the nearby pristine and protected Bwabata National Park which is located 130km east of the proposed site and Mahango game park (located 155 km from the proposed area) as well as other pristine environments along the Okavango river banks where there are limited number human developments and activities going on . The region however hosts a vast diversity of birds, which are a key tourist attraction of the Kavango east region (Mendelsohn 2009). Approximately are 116 mammals, 430 bird, 25 amphibian (15 of which are largely dependent on riverine habitats), 67 reptile and 79 fresh water fish species inhabit the area (MET 2008).

It is vital to note that the development is being done on an area where there was a development before and there are homesteads within the 5km radius vicinity of the proposed lodge, thus impacts on animals will be minimal because the environment is already disturbed and the lodge will posed a possible opportunity to improve wildlife conservation in the community. The wildlife corridor that habits more animals other than aquatic species is more than 130km East from the site since most of the areas surrounding the lodge are irrigation schemes, villages along the Kavango river and lodges established within the river.

3.1.1 Mammals

The following list of occurant mammals in the area was derived from existing literature and personal observation. The list of mammals in the table below was then recognised as occurring in the area (MET, 2008).

Table 3: List of mammals occurring in and endemic to the region

Species	**Conservation Status**
African Buffalo	
Hippopotamus	Endangered
Tsessebe	
Blue Wildebeest	
Sitatunga	

Common Reedbuck	
Elephant	Endangered
Giraffe	
Spotted Hyena	Endangered
Kudu	
Sable Antelope	
Roan Antelope	
Red Lechwe	
Chapman`s Zebra	Endangered
African Leopard	Endangered
South African Cheetah	Endangered

3.6 Birds

The Mahango area and the Okavango River in western Bwabwata are listed as an internationally recognized birds area hosting bird species that are threatened at global level and range as avian diversity hotspots.

3.7 List of bird species occurring in the area

Specie	**Common Name**	**Conservation Status**
Rhynchope Flavirostris	African Skimmer	Endangered
Glareola nordmanni	Black-winged Pratincole	Endangered
Egretta vinaceigula	Slaty Egret	Endangered
Bugeranus carunculatus	Wattled Crane	Endangered
Nettapus auritus	African Pygmy Goose	Endangered
Centropus cupreicaudus	Coppery-tailed coucal	Endangered
Gorsachius leuconotus	White Banked Night Heron	Endangered

Ardeola rufiventris	Rufous-bellied Heron	Endangered
Porphyrio alleni	Allen`s Gallinule	Endangered
Falco dickisoni	Dicksino`s Kestrel	Endangered
Turdoides melanops	Black-faced Babbler	Endangered
Laniarius bicolor	Swamp Boubou	Endangered
Cichladusa arquata	Collared Palm Thrush	Endangered
Lamprotornis mevesii	Meves`s Glossy Starling	Endangered
Burcorvus leadbeateri	Southern Ground Hornbill	Endangered
Glaucidium cuculoides	Asian Barred Owlet	Endangered
Campethera bennettii	Bennett`s Woodpecker	Endangered
Phylloscopus sibilatrix	Wood Warbler	Endangered
Phyllocuspus bonelli	Leaf Warbler	Endangered
Cisticolidae juncidis	Cisticola	Endangered

3.8 Amphibians, Reptiles and Invertebrates

The Shitemo village has a high occurrence of reptiles, in particular snakes. This includes cobras, puff adders (inhabit grasslands and bush ecosystems) and the black and green mamba (inhabiting the riverine ecosystems). The area is a habitat of a wide number of lizard species and tortoises. The baseline study further revealed existence of snails, centipedes, spiders and scorpions. According to members of the community and the wildlife directorate interviewed there are a number of crocodiles from the nearby river that destroy the community's properties. Fish species include the world renowned tiger fish, tilapia, cat fish and nembwe.

3.9 Topography and Elevation

The area around the proposed project has an overall flat topography. It is characterized by undulating plains dipping towards the east at an elevation of between 1000 and 1200 m above sea level. The area has been flattened through erosion to less than 10 m relative difference in relief. The remnants of the dune fields remain clearly visible on satellite images (Graz, 1999). The depth of the sand cover is estimated at between 20 and 40 m, and the overall Kalahari sequence of the area is up to 150 m deep.

3.10 Geology and Soil

The area is underlain by the Kalahari and Namib sands, which are dominated by cambic arenosols, albic arenosols and calcic xerosols (Mendelsohn & el Obeid, 2003). According to the Agro-Ecological Zoning Programme (AEZ) of the Ministry of Agriculture, Water and Forestry and the World Reference Base for Soil Resources (FAO, 1998), the arenosols contain sandy soil with poor retained nutrient capacity. The sand further is slightly acidic which also results in nutrient deficiency. Generally, soils are deep and purely sandy with average soil fertility. Heavier textured soils have formed in the so-called omuramba (wide, flat watercourses with-out visible gradient). A number of these omuramba cross the area are in eastern direction from the project area. The omuramba, because of nutrient-richer soils, are sought-after for fields of agricultural vegetation by the local population.

3.11 Hydrology (Surface & Ground Water)

The ground around the site carries productive porous ground water aquifers. Secondly, there is access to potable surface water from the perennial Okavango River. The River Basin engulfs an area of rounded 190,000 square kilometres accross Angola, Namibia and Botswana (Mendelsohn and el Obeid 2003). Its water originates from Angola and ends its flow in the Okavango delta in Botswana. Approximately half of its flow comes down the Cuito, with the remaining 50% originating from Cubango as it enters Kavango at Katwitwi. Flows along the Cuito are comparatively stable, whilst those of the Cubango are more susceptible to the varying seasons. Nevertheless, the strongest flows result from good summer rain falls in the upper catchment of the Cubango. Neither Namibian nor Botswana rains effectively contribute to its water levels. However, any impacts stemming from Namibian soil immensely affect the quality and quantity of water flowing into Botswana.

4 Chapter Four: Public Participation

4.1 Introduction

The required public participation process was conducted in accordance with regulations 21 to 24 (EMA 2007, Regulations 2012). It was initiated by way of personal notification given to all potential interested and affected parties (I&Aps), as well as newspaper advertisement in the Namibian newspaper (16 and 23 June 2016). The Binding Information Document (BID) containing all relevant facts in respect of the project was made available to the I&Aps potential interested and affected parties registered or who attended the public meeting.

4.2 Public Participation Process Notification

4.2.1 Project initiation

The site visit took place on the 23 April 2016 and the proponent introduced the EIA team to the village headman. During the visit the proponent explained the intended activities clearly mapping out the locality of the proposed project. The EIA team headed by Ms Shitaatala surveyed the current environment in order to determine its status in terms of vegetation, biodiversity, social aspects and wildlife. With the advice of the headman the team also decided a date (29 June 2016) and scheduled a public meeting.

4.3 Scoping and Assessment Meeting

This public meeting took place on the 29 June 2016 (13h00) at the big tree at the headmen's residence in agreement with Regulation 21. A call for participation was extended for both I&APs to register any concerns or issues. This call was placed twice in The Namibia Newspaper dated 16 and 23 June 2016 (see appended newspaper advert) giving ample time for both I&APs to comment before the scheduled public meeting. However, only two interested parties registered.

The meeting took place as planned and there was a very low attendance of stakeholders due to a funeral in the village. Consequently, the proceeding could not continue as stakeholders (community members) in attendance felt insufficient to represent the whole community. Rather the delegation headed by headman suggested and agreed to hold another meeting on Saturday 16th of July 2016 at 09h00. Taking into consideration that many people in Shitemo village have little or no access to newspapers, the headman opted to inform the community and invite them via the local school,

church and Village Development Committee (VDC). On the Saturday of 16th July 2016 the public meeting was held at same venue (Big tree at the Headman's residence). This meeting was a success as more than 32 I&APs were in attendance, with a balanced gender representation (find the attached attendance register). Attendees raised theirs concerns, issues and comments towards the project. The BID was distributed to meeting attendants at both meetings. Due to the fact that the BID documented is presented in English, efforts were considered and the team had Gciriku translator to enhance understanding of the issue at hand and the intended activity. Government departments, the local authority, local leaders and the local residents in the vicinity of the project were consulted as key stakeholders. This consultation process also provided stakeholders opportunity to express their views and concerns about the project which assisted in determining the scope of work for the EIA. Therefore this process enabled all stakeholders to provide crucial information regarding environmental, social and economic impacts and identified instrumental mitigation measures for the minimising adverse impacts.

4.4 Concerns, comments and other issues

Overall the project idea was well received by the village headman and as well as the community. Their comments were mainly related to employment opportunities, environment and accessibility as well the terms agreed upon during the community during meeting between Village Development Committee and the proponent. Find the minutes appended. Below is the summary of the issues, concerns and comments that rose during public consultation meeting held at Shitemo village.

4.5 Site Boundary and accessibility

The proponent was encourage to respect the community decision defined and agreed with VDC to put in place an accessibility gate that allow the villagers to access the island which will be enclosed by King Nangara Lodge fencing and site boundary. The community also edged the proponent to respect people's property such as stray cattle, goats and sheep into his boundary because they will be grazing and they are a source of survival for the villagers hence there is no need for poisoning or shooting stray animals.

4.5.1 Employment

The community urged that where possible and necessary the proponent should employ locals particularly for manual work and also prioritize qualified locals for skilled jobs too. Gender equals employability was also encouraged by the women in attendance.

4.5.2 Vegetation conservation

Regarding vegetation conservation, community urged the proponent to minimize the clearing of land as reasonably as possible in order to preserve the natural environment. The community also recommended that the vegetation is surveyed to before the lodge is constructed so that no important trees will be removed which are birds' habitat and other wildlife.

4.5.3 Ownership of the project

The community also raised concerns and inquired on the ownership of the project seeking clarity on whether the proponent is a sole owner or there are other people involved whereas the proponent confirms that he is sole owner on the project.

4.5.4 Community Services and benefits

The proponent reconfirm that he will bring a transformer box closer to the village as agreed with in VDC meeting. However, he also clarified that he will not be liable for individual villager's power consumption. He will assist with the reconstruction and fix the standing tractors which can be used for ploughing by the villagers. Also he will open a small kiosk for groceries and frozen food.

4.5.5 Flooding management issues

The community voiced concerns regarding flood management as the project will be erected in the flood zone. The community proposed that the proponent should be aware of risk of flooding and encourage to him to consider flood resistance materials for both the project building architectural designs and foundation. The VDC also recommend that all construction activities should be 100m further from the river bank in line with the Namibian forestry act.

4.5.6 Culture and conflict resolution

The headman reiterated the importance culture, that respect of village elders and village leadership is crucial in Shitemo Village. Therefore he stressed that the proponent should consult the leadership whenever he encounters challenges. Also if any conflict arises between him and the villagers, both parties should dialogue in order to manage and solve the conflict.

4.5.7 Project implementation and support

Finally, the community supports the project and recommend that the project should carry on pending that both parties fulfil the unanimous agreement from discussions and comments preceded from the meeting with VDC. The community embrace the project as it open new opportunities for business and tourism in the area.

5 Chapter Five: Environmental Impacts Assessment for the Proposed King Nangara Lodge upgrade

5.1 Introduction

The proponent has committed himself to limiting the impacts on the environment associated with the expected operation in Shitemo Village. In line with the Namibian Environmental Management legislation and International best practices, the proponent will implement an Environmental Management Plan (EMP) in order to prevent, minimise and mitigate negative impacts. This chapter will cover and identify potential environmental and socio-economic impacts associated with the lodge which may interfere with environment and social setup of the village. Positive economic impacts at local level and nationwide at large will also be assessed.

5.2 Impact Assessment Methodology

Each of the potential impacts identified is screened according to the set of indicators set during the impact screening process as illustrated below. The scoping process was used addressed all possible impacts and an analysis was made to investigate its relevancy to the project. Furthermore impacts screening process was used to determine the level of significance and degree of each impact. Below are the assessment criteria used to cater for King Nangara Lodge operation. Impacts discussed in this section falls under the "YES" answer, namely those which fall within the scope of the development and the responsibility of the client. Impacts falling outside the scope of this development were identified during the process and the information available was deemed sufficient to make an assessment and recommendations

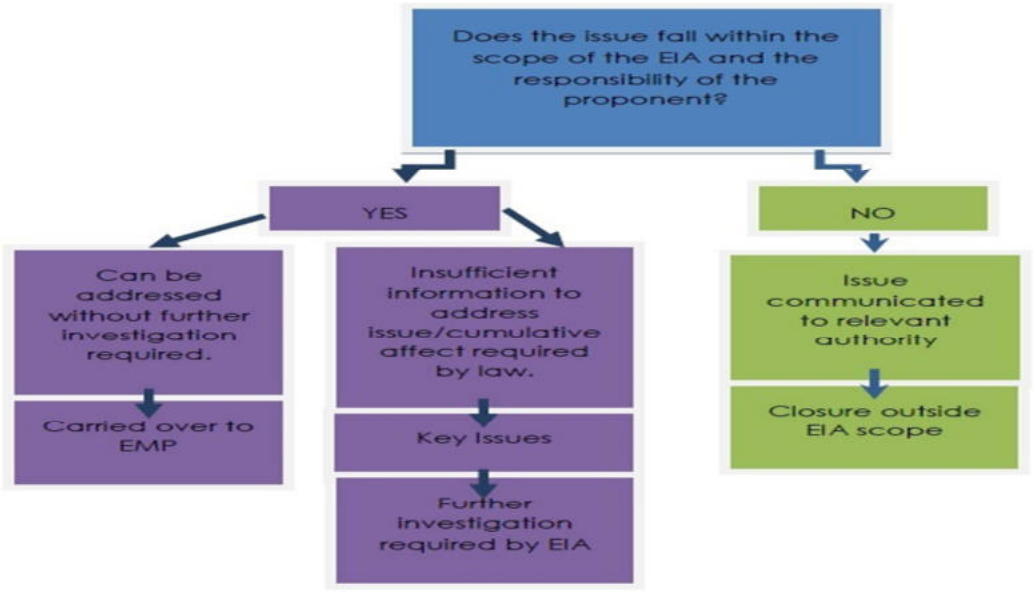

Figure 3: Impacts Scoping Process, Source: MET (2012)

Table 4: Impact Screening Criteria

Aspect	Description
Nature	Reviews the type of effect that the proposed activity will have on the relevant component of the environment and includes "what will be affected and how?"
Extent	Geographic area coverage indicating whether the impact will be within a limited area (on site where construction is to take place); local (limited to within 15km of the area); regional (limited to ~100km radius); national (extending beyond Namibia's boarders).
Duration	Whether the impact will be temporary (during construction only), short term (1-5 years), medium term (5-10 years), long term (longer than 10 years, but will cease after operation) or permanent.
Intensity	Establishes whether the magnitude of the impact is destructive or innocuous and whether or not it exceeds set standards, and is described as none (no impact); low (where natural/ social environmental functions and processes are negligibly affected); medium (where the environment continues to function but in a noticeably modified manner); or high (where environmental functions and processes are altered such that they temporarily or permanently cease and/or exceed legal standards/requirements).
Probability	Considers the likelihood of the impact occurring and is described as uncertain, improbable (low likelihood), probable (distinct possibility), highly probable (most

	likely) or definite (impact will occur regardless of prevention measures).
Significance	Significance is given before and after mitigation. Low if the impact will not have an influence on the decision or require to be significantly accommodated in the project design, Medium if the impact could have an influence on the environment which will require modification of the project design or alternative mitigation (the route can be used, but with deviations or mitigation) High where it could have a "no-go" implication regardless of any possible mitigation (an alternative route should be used).
Status of the impact	A statement of whether the impact is positive (a benefit), negative (a cost), or neutral. Indicate in each case who is likely to benefit and who is likely to bear the costs of each impact.

The application of the above criteria is to determine the significance of potential impacts by the propose lodge establishment uses a balanced combination of duration, extent, and intensity/magnitude, modified by probability. Significance is established by extend, duration, intensity and probability. The Impact assessment matrix further gives significance of impact before mitigation and after mitigation as described below

Table 5: Impact Rating Criteria

Significance Rating	Criteria
Low	Where the impact will have a negligible influence on the environment and no modifications or mitigations are necessary for the given development description. This would be allocated to impacts of any severity/ magnitude, if at a local scale/ extent and of temporary duration/time.
Medium	Where the impact could have an influence on the environment, which will require modification of the development design and/or alternative mitigation. This would be allocated to impacts of moderate severity/magnitude, locally to regionally, and in the short term.
High	Where the impact could have a significant influence on the

	environment and, in the event of a negative impact the activity(ies) causing it, should not be permitted (i.e. there could be a 'no-go' implication for the development, regardless of any possible mitigation). This would be allocated to impacts of high magnitude, locally for longer than a month, and/or of high magnitude regionally and beyond.

5.3 Impact Assessment

Table 6: Environmental impact assessment matrix for King Nangara lodge and camp sites establishment

Impact	Status/nature	Extent	Duration	Intensity	Probability	Significance		
						Before Mitigation	Mitigation applied	Post Mitigation
Construction Phase								
Physical disturbance of the soil during transport and construction activities	-Erosion of top soil -Proliferation of tracks - Possible siltation of Kavango river	Local	Short	Medium	Probable	Medium	-Restrict construction activities to defined areas. -Use surface anchored foundations were possible with very limited rock breaking. -Ensure that only site where structures are to be set are only affected.	Low
Removal of vegetation during construction land clearing.	-May result in removal and destruction of protected and	Local	Short term	Medium	Definite	High	-Limit construction activities and limit movement to designated areas only. - Implement and monitor the	Medium

	endemic tree species						vegetation management plan -Vegetation removal should be done in consultation with and consent from Department of Forestry	
Loss of local wildlife such as reptiles, fish etc	-The project site has little/no major wildlife because of human disturbance s in the area, however some small animals such as reptiles, squirrels and bird that are locality bound are likely to be	Local	Short	Low	probable	Medium	-Remove special reptile species encountered -Forbid hunting of animal within the project site. -Avoid overfishing activities by visitors and guests -Only operate during the day the is 0800hrs to 1700hrs to minimise noise propagation	Low

	affected due to loss of habitat and noise nuisance							
Noise pollution from movement of vehicles and construction activities.	-negatively effect on local animals, birds and constructors	Regional	Temporary	Medium	Highly probable	High	-Incorporating recommended no-go zone into final design of site plan and construction areas, where activity is restricted to the project boundary only. Also provide authorized employees with earplugs	Medium
Habitat loss, including foraging, roosting	Negative impact on local habitats and vegetative species	Local	Permanent	High	Definite	High	-Incorporating recommended no-go zone into final design of the site infrastructure and camp sites.	Medium
Upgrading of existing access road	Negative effects of road upgrade operations by heavy	Local	Short term	Medium	Definite	Medium	-Ensuring Access road construction does not affect vegetation and animals not within the road marked area.	Low

	machinery						-Stagger road upgrades may be done once/twice a year only to avoid continuous nuisances	
Archaeological Landscape	Visual degradation	Local	Short Term	Medium	Improbable	Medium	Demarcate, protect and avoid development near sites. If removal is inevitable, apply at Heritage Council via an archaeologist	Low
Intrusion in a visual sensitive landscape	Visual pollution and loss of sense of place	Local	Long term	Medium	Definite	Medium	Break the spatial dominance of the lodge's buildings and camping equipment's by using various shades of a low tone colour such as grey in bands on the structure to break the visual texture. This will also lower the relative size perceived, the visibility distance, and the scale contrast. -Limit the night lighting around the lodge's compound.	Low
Disturbance of land with potential for	Loss of sense of ownership	Local	Long term	High	Definite	Medium	-Ensure strict implementation of the EMP and not to affect	Medium

wild animals and livestock grazing.	of place and community intrusion						surrounding areas around the lodge boundary by removing vegetation and grazing lands.	
Change in landscape character (New land use)	New structures such as buildings and roads in the environment	Local	Long term	Medium	Probable	High	-Ensure that new structures blend in with the environment and there is rehabilitation of disturbed area to leave the area in almost the same level as it was before if not better.	Low
Contamination of soils by hydrocarbon pollutants (grease, oils, fuel spills and leakages from machinery and fugitive wastes.	Heavy equipment oils and fuel storage tanks on site	Local	Short term	Medium	Probable	Medium	-Ensure there is a spillage management plan in place and licensing of any oils or fuel stored on site	Low
Air Pollutants such as dust releases	Dust releases can be a nuisance to the local	Regional	Short term	Medium	Probable	Medium	-There is need to wet the areas before working on them especially roads upgrading and	Low

	residences as well as help contributing into local atmospheric particulate matter content						foundation digging	
Noise and vibrations from heavy equipment and vehicle movement frequency	Noise and vibrations causes public nuisance as well as driving away local animals such as hippos nearby	Local	Short term	High	Definite	High	-There is need to use noise suppression equipment of engines -Operations should only be done during the day were noise propagation levels are limited as compared to during the night	Medium
Solid Waste from construction (rubbles, cement bags, paint containers, broken	-Waste from construction activities can result in pollution in the	Local	Long term	High	Definite	High	-An effective waste management system to be implanted by the Lodge management team, separating waste before disposal.	Low

equipment etc.)	environmental especially material that is not bio-degradable.							
Employment opportunities	The project will create employment opportunities during the construction stage	Regional	Long term	High	Definite	High	-Employ local individual through the headman to ensure equal employment opportunities.	High
Health and social issues	Potential accidents and illnesses.	Local	Short term	Low	Probable	Low	-Health and safety regulations should be enforced on all the workers. Safety regulations include life and health insurance, first aid kits; protective clothing such as uniforms and gloves.	Low
Process Issues i.e. Lack of adequate knowledge on the	Local community may miss	Local	Long term	Medium	Definite	Medium	-Continue with public engagement through the headman and other	Low

risks associated with the project	opportunities or fail to raise issues in time of the study.						government extension offices	
Operational Phase								
Solid Waste from restaurant food waste, guests waste, packaging	Waste disposal into the natural environment can be detrimental to wild organisms and at times highly toxic	Local	Long term	Medium	Definite	Medium	-Implement a waste management system, separating waste accordingly and employ sustainable disposal strategies. -Recyclable waste will be sent for recycling in Rundu. -Non-recyclable waste will be burnt in an incinerator that will be on site	Low
Underground and surface water pollution from effluent and solid waste	There is a nearby Kavango river and potentially shallow water table hence	Regional	Long tern	High	Probable	Medium	-Use of septic on liquid waste and incinerators for solid waste. Location of the septic tank to be construct distance from the river and lined with strong material to prevent seeping of sewage into the	Low

	there is a rick contamination of the water bodies.						ground.	
-Carbon footprint from General emissions, energy usage etc.	Even though it is on a smaller scale any development has a carbon footprint that negatively affects the immediate atmospheric conditions and increasing greenhouse gasses in the atmosphere	Regional	Long term	Low	Definite	Medium	- Energy efficiency practices such As using solar energy options -Use biowaste as compost for the gardening -Encourage quests and employees to switch off electrical appliances after use.	Low
General disturbance to the	Daily visits and camping	Local	Long term	Low	Definite	Medium	-Restrict activities to defined areas.	Medium

natural ecosystem of the area both fauna and flora ecological integrations.	will have an impact on the surrounding ecosystems through noise, human movements and forest tracks						- For movement in the bushes use designated tracks to avoid unnecessary removal of vegetation	
Impact on wildlife movement in the area	-The project site has little/no major wildlife because of human disturbance s in the area, however the project proponent intents to vegetate the	Local	Long Term	Low	Definite	Medium	-Ensure that during operation animal habitats are not disturbed -Planting of more trees to promote animals moving into the area to improve the lodge's aesthetic value through wild game viewing. -Noise will be minimised from moving vehicles, human movements and domestic noise such as radios.	Low

	area and conserve it to promote wildlife movement into the project area during operation.							
Effluent waste from bathing showers and sewer connections	Environmental pollution especially to the nearby Kavango river	Local	Long term	Medium	Definite	High	- All sewerage waste will be channelled into septic tanks. -Treated waste water will be used for watering the garden	Low
Disturbance of biodiversity due to vibrations (Local animals such as birds and small animals could be driven away from	Local nuisance	Local	Long term	Medium	Definite	Medium	-Limit the moving of vehicles.	Low

their habitats)								
Physical Infrastructure immovable property	The area will have new landscape features which will bring in a change in the local scenery	Local	Long term	Medium	Definite	Medium	-The project proponent should limit infrastructure footprint by using local materials for construction to avoid usage of alien material.	Medium
Access restrictions to forest services around the project site, meaning reduced access to medicinal plants, and plants of religious importance.	-Accessibility frustration and loss of sense of place	Local	Long term	Low	Improbable	Low	-The area will not be restricted to locals, but it will be fenced off.	Low
Population influx	-Results in social tensions and an increase infection of	-Local	-long term	Medium	Definite	High	-Educate employees and visitors on social integration and sexual behaviour	Medium

	sexually transmitted diseases particularly HIV and AIDS, and other Sexual Transmitted Diseases (STDs).							
Social integration	Potential for conflict between people of different backgrounds and cultural beliefs.	Local	Short Term	Medium	Probable	Medium	-The proponent should address and ensure prior agreed activities should be put in place to avoid conflict. The lodge should also establish a public relations policy guiding tourist visitor's contact with locals.	Low
Community development including	Employment creation and business	Regional	Long term	High	Definite	High	-Promote local businesses and employ locals	High

promotion of local products	integrations through selling of local products to visitors and supplies for the lodge.							
Roads and power line maintenance	Disturbance of wild animals and vegetation through increased traffic	Local	Long term	Low	Probable	Medium	- Enforcement of a strict speed limit. Limit traffic to daylight hours.	Low
Decommissioning phase								
Removal of Infrastructure	If there will be removal of infrastructure the environment is bound to be disturbed again	Local	Short Term	Medium	Probable	Medium	-In the event of infrastructure removal, the proponent has to notify the Ministry of Environment as well as dispose all waste sustainably.	Low

	and waste will be generated.							
Neglecting of Important facilities and buildings	Infrastructure such as septic tanks needs routine management.	Local	Short term	Medium	Probable	Low	-The proponent will probably turn the place into a place of residence other than total neglecting of the area.	Low
Loss of employment	During the decommissioning phase there might be retrenchment of employees which will affect their livelihoods and source of income.	Regional	Long term	Medium	Definite	Medium	-In the event that the proponent decides to stop operations, appropriate retrenchment procedures should be followed. -Social security for employees should be put in place in anticipation for cases like these.	Low

6 Chapter Six: Environmental Management Plan (EMP)

6.1 Introduction

This section is aimed at describing the Environmental Management Plan (EMP) for King Nangara Lodge establishment. The EMP stipulates the management of environmental programs in a systematic, planned and documented manner. The EMP below includes the organizational structure, planning and monitoring for environmental protection at the proposed farm area development and other areas of its influence. The aim is to ensure that the lodge facility maintains adequate control over the project operations in order to:

- To prevent negative impacts where possible;
- Reduce or minimise the extent of impact during project life cycle;
- Prevent long term environmental degradation.

6.2 EMP Administration and Training

There is a strong need to clearly outline the roles and responsibilities of all stakeholders to ensure that the EMP is fully implemented. There is also a need for the proponent to appoint an overall responsible person (Environmental Control Officer) to ensure the successful implementation of the EMP. The Environmental Control Officer needs to have qualifications and knowledge in environmental management /sciences, and understanding of EMP administration. Under the management actions, each action is allocated to a responsible entity to ensure that the specific action is managed and documented properly. All key role players such as contractors who will be involved during the construction of the services must be informed about the contents of this EMP and activities to be undertaken to mitigate the potential impacts identified. All key personnel who will be involved in project management and implementation will be informed about the contents of this EMP through structured training programs; this will form part of the regular site meetings and briefings.

6.3 Construction Phase Impacts

The proposed lodge construction phase forms an integral part of the project development cycle. It is however crucial to note that the development entails activities that will pose threats to the surrounding environs and impacts will range from vegetation removal, construction waste, noise and air pollution among other impacts. As assessed in the impact assessment chapter the EAPs noted crucial environmental impacts associated with the construction phase and as follow up to the impacts identified and assessed, the following impact management plan has been crafted:

Table 7: Impacts associated with the Construction Phase

Impact	Description	Effects	Class	Time frame	Responsibility	Action
Noise pollution	Noise will be generated through: -Access road upgrading -Construction of site administration offices -Moving vehicles.	- The health of working personnel could be disturbed. - Local residents could be disturbed by the noise. - General annoyance -Driving away of local animals species near the project site	Environmental	2-3 months	King Nangara Environmental Control Officer	- A construction interval will be established, and adhered to. - Workers will be issued and provided with personal protective equipment. - Public will be notified through printed timetable stating planned operational activities. - Construction activities will be conducted during daytime.
Dust Generation	Dust will accumulate as a result of the land preparation , clearing and produced by movement of construction equipments	- Can lead to respiratory illnesses especially to those working in the area. -increase Particulate	Environmental/ occupational	2-3 months	King Nangara Lodge Environmental Control Officer	- Dust suppression will be done through watering dust source surfaces.

		matter levels in the air and cause visual pollution				
Debris Accumulation	Debris will accumulate due to construction activities, removal of existing dilapidated infrastructure on site	- Can be an eyesore. - Can be source of water and soil pollution. -can result in scenic pollution	Environmental	2-3 months	King Nangara Lodge Environmental Control Officer	- Reuse reusable material such as bricks. - Collect all non-reusable debris and dispose applying appropriate waste management procedures.
occupational health and safety risks and accidents	Construction related Safety and Health hazards	-Injuries to workers such as Occupational dermatitis, slips and fall of humans and objects, musculoskeletal disorders, etc.	Health and safety	Project life time	King Nangara Lodge Environmental Control Officer	- Equip workers with Personal Protective Equipment (PPE). - provide trainings on how to effectively use the PPE. -Provide platforms for briefings and meetings about possible safety and health hazards in the work place
Employment creation	The construction exercise provides an opportunity of	- Improves disposable income to those	Socio-economic	Project life time	King Nangara Lodge	- Work with Shitemo Village headman on

	outsourcing work	employed and their immediate families.			Environmental Control Officer	acquiring non skilled labour from the local residents.
Population Influx	The project will bring in skilled and unskilled workforce into Shitemo Village from other places increasing population density in the area.	-There is potential for cultural systems conflict between locals and new people in the area -Overpopulation around local surroundings, i.e. exceeding local area carrying capacity -Potential for rife prostitution and spread of HIV/AIDS and other STDs -Potential for scaring away of local wild animals , poaching and removal of protected indigenous	Socio-economic	Project life time	King Nangara Lodge Environmental Control Officer	-Train and brief employees to respect local cultures and leaders, -Engage on massive sexual health training and awareness and providing contraceptives such as condoms, as well as provide means counselling for those that are affected by HIV/AIDS and other STDs, - Provide environmental trainings and continue on a regular basis briefing the employees about nature conservation (animal and plants), and discourage hunting of wildlife and cutting down of trees.

vegetative species

6.4 Operational Phase

The operational phase is the most critical component of project implementation and it is normally associated with several severe impacts. The phase comprise of the actual operation of the lodge site. This phase is expected to last for over 20 years of operation as long as the venture is still viable. There will be several impacts that will occur on a daily basis or other sequential routine. The phase forms the basis of an Environmental Management Plan that is detailed in Chapter and will be followed by the decommissioning phase. The major impacts identified by this study for the operation phase are as detailed in the previous chapter.

Table 8: Impacts associated with the Operation Phase

Impact	Description	Effects	Class	Time Frame	Responsibility	Action
Noise pollution	-Vehicle movements -Periodic road upgrading	- The health of working personnel could be disturbed. - Local residents could be disturbed by the noise. - General annoyance -Driving away of local animals species near the project site.	Environmental	Project life time	King Nangara Lodge Environmental Control Officer	- Schedule road maintenance during day time and avoid upgrades over short periods of time. - Provide public notices through printed timetable showing schedule of planned work
Solid waste pollution	Solid waste emanating from food wastes, packaging materials, containers, household waste, glass, wood, etc	- Can result health issues and some waste can be highly hazardous and toxic to the environment	Environmental	Project Life time	King Nangara Lodge Environmental Control Officer	-An initial waste audit will be conducted at the Project in order to identify areas type and volume of waste -When it is appropriate, materials will be reused and/or recycled in order to minimize the amount of waste sent to the incinerator - All solid waste that is not

						bio degradable and can be incinerated will be incinerated on site.
Human movements	Visitors to the site will have interests in moving around the bush area and maybe nearby communities	-Movements may drive away animals within the radius of the site. - This can also result in vehicle vibrations which maybe a nuisance to some people in the surrounding area.	-Ecological -Social	Project life time	King Nangara Lodge Operations manager	-Come up with a social contact policy guiding the movement of visitors around the area -Promote the use of wild tracks and no vehicle tracks in the bushes to avoid driving away wild animals.
Flooding Management	During the consultation process it was noted that the area occasionally floods, like some other area near the Kavango river.	- There is potential for destruction of built property and cause losses to the project proponent.	Environmental Economic Social	Project life cycle	King Nangara lodge owner Namwater	-There is need to be aware of possible flooding on the proposed area occasionally. -The proponent will have to use a special foundation for the structure that will be constructed on site. -The lodge will have to be closed for a few weeks per

						year during the rainy season because of site accessibility and flooding of the area. -Construct high foundations to have building floor level at a higher elevation to avoid water flowing into the the interior during the summer flooding periods -.Ensure that your entire main drains, gutters and down pipes are working correctly and are clear of all blockages. -All electrical equipment and sockets should be installed to a higher level above known flood levels.
Water quality	Liquid waste from the lodge operations	-Ground and surface water contamination: Both chemical and physical contamination	Environmental	Project life time	DEA / Namwater	-Frequently monitor effluent waste quality -The septic will be concretised to avoid contamination of groundwater and any leaks

						should be fixed timeously.
Occupational Hazards / Work place accidents	Operating of household equipment such as stoves, irons, boilers etc can cause workplace injuries	-Potential accidents and illnesses.	Health, social	-Project life time	Ministry of Labour	-Health and safety regulations should be enforced on all the workers. -Safety regulations include life and health insurance, first aid kits; protective clothing such as uniforms and gloves. -Proper storage of highly flammable products such as gas etc, and installation of fire extinguishers. Workers should not be allowed to exceed working hours.
Poor customer service	Daily running of lodge not properly managed.	Customer dissatisfaction	Economic Social	Project life time	-Lodge manager	-The Lodge Manager should manage the daily operations and ensure good customer care

Employment creation	Employment creation for the local residents	- Increases disposable income. - Decreased Rural to urban migration.	Socio-economic	Project Life Time	Shitemo Village headman	- Provide information to the local community detailing labour requirements (number of workers and type of skills) - Provide information on social benefits for the employees and the local community. - Conduct transparent recruitment process of workers and of contractors, providing preferences to the locals where feasible.
Immoral Behaviour	Increased inflow of people into the area may result in immoral behaviour and increased sexual activities.	-Increased infection of HIV/AIDS and other sexual diseases. -Increased unwanted and teenage pregnancies -Increase in thieving incidences, assaults and robberies.	Socio-economic	Project Life Time	Lodge manager and Shitemo Village Headman	- Conduct awareness campaigns on promiscuity and HIV/AIDS issues. - Conduct awareness programmes on the effect of alcohol and drug abuse. - Support the creation of a nearby police post.

-Increased incidences of drugs and alcohol abuse.

6.5 Decommissioning Phase

In the event that the project proponent intents to decommission the project well before the completion of its expected lifespan, all the necessary steps will be taken to ensure that the application of the best environmental management practices and adherence to legal and policy legislations is upheld. These progressions shall follow an appropriate decommissioning plan that will work in the best environmentally friendly manner taking into considerations the principle of sustainable development. The anticipated impacts of a standard and provisional decommissioning plan that can be modified with time are as detailed below.

Table 9: Anticipated Impacts of the Decommissioning Phase

Impact	Description	Effects	Class	Time frame	Responsibility	Action
Physical infrastructure Immovable Property	Immovable property will be on site	Unmanaged infrastructure on the site	Environmental	Decommissioning phase	Lodge owner	-Should not be destroyed and but instead used for other purposes -The proponent has been previously using the area as his residential area hence he will convert it to his residential area by following relevant procedures.
Loss of Employment and elevated poor Livelihood	With project closure, there will be loss of employment and social benefits.	- Expected hardships amongst families once dependent on income from the quarry operations. - As a results of loss employment there could be an increase in social evils such as theft, prostitution and robberies.	Socio-economic	Decommissioning Phase	Lodge manager Lodge owner	- King Nangara lodge will invest in community projects by ploughing community fields and livelihoods development projects. -Awareness and training regarding self-sustaining livelihoods. -Social benefits for employees to ensure lifelong

quality of life.

6.6 Solid Waste Management

King Nangara Lodge's solid waste management plan will follow the waste management principles of reusing, recycling and reducing. This will imply that at waste generation on site will be minimal to ensure that there is no waste management problem. Waste that can be reused will be put to appropriate use at the lodge such as reusing plastic packages, and containers.

Waste segregation will be done in relation to biodegradable and non-biodegradable waste. Biodegradable waste such as vegetables, food leftovers and paper will be composted on site and the compost will be used on lawn and flowers to be planted on site. All other waste will be incinerated on site on a micro-incinerator to be installed on site. The incinerator was adopted because the project site is not within Rundu Town Council's jurisdiction and there is no waste dump site near the project site that can be used. It is important note that waste incinerated is going to be minimal such that incineration will be done at least once every 2-4 weeks during the peak periods.

6.7 Incinerator Contingency Plan

The proponent will install a small incinerator on site to be managed by a trained and assigned caretaker who will be inducted on the incinerator operations. He/she should be further provided with PPE such as respirator, clothing, safety boots, face shield and safety glasses as per requirement of the Labour Act.

Operation of the incinerator will be done in accordance to optimal conditions (e.g. manufacturer recommended temperature, pressure) to ensure complete combustion and reduce harmful gases emission; Attention should be given to plastic, bulbs and electronic based wasted are prohibited to be burned and will not be incinerated.

Incinerator management should involve the following guidelines:

-Regular checks on waste incineration should be only done at least once a week in order to ensure smooth operation and reduce emissions.

-Periodic maintenance should be maintained to ensure full operation of the incinerator and all malfunctions to be rectified before to incomplete combustion of waste.

-Incineration area should be fitted with accessible firefighting equipment in case of emergencies.

-During its operation non authorised people should not enter the incineration area as it may be dangerous for them.

-Incinerator siting should be away from buildings and the prevailing wind direction should blow smoke away from the lodge.

-Stack emissions will also be measured regularly so as to incorporate the data into the quarterly reports during construction and operations.

6.8 Sewage and Effluent waste Management

In the absence of the municipal sewage system, sewage is highly environmental dangerous and remains a hazard to human health if not properly managed according to public health and environmental standards. For the purpose of this development a Biorock Sewerage Technology using high grade conservancy tanks will be used for treating the effluent and sewage discharge from the lodge. The Biorock treatment technology enhances and combines the principles of primary separation (septic tank) and aerobic biological filtration (conventional trickling filters).This type technology is usually used for domestic purposes including lodges and can work independently from the municipal system. The treating process is biological and doesn't require power and produce odour. Treated water from the system will be recycled and used for watering the lawn and the plants while the sludge will be sucked out.[source]

The installation is environmentally friendly and requires servicing twice less than the traditional septic tanks. The tank material is waterproof and durable, however ton enhance environmental safety the holding pit for the tanks will be lined with Structural Epoxy technology which incorporates a high build, fibre reinforced polymer (FRP) epoxy. This Epoxytec system is the highest build liner that is leachate and acid proof. This liner is being used because of the flooding risk of the area and thus there is need for an airtight system that will not be compromised during flooding periods. The Structural Epoxy System offers high flexural strength properties, impressive modulus and 16,000psi compressive strength for structural reclaiming needs and lining as an all-in-one-shot single system. The system is often specified for structures experiencing ultra-high levels of I&I pressure with ultra-high levels of H2S (up to 800 ppm).

In relation to the sewerage system management on site the following guidelines are recommended:

- A contingency plan must be drawn up to protect against overflow of the conservancy tank. A sump or lined pond can be designed below the conservancy tanks to contain any overflows.
- Ingress of storm water into the conservancy tanks must be prevented by providing appropriate drainage.
- The tanks siting will be located more than 200m from the river bank
- The tanks must have airtight manhole covers to allow access to the tanks for the removal and safe disposal of the tanks contents.

Furthermore in relation to flooding risk the following specifications will be followed:

- All sewage pipe penetrations through walls/foundations shall be sealed using an expansive sealant, a molded sleeve, an elastomeric seal, or a neoprene seal.
- The septic tank access cover shall be sealed with a neoprene gasket and bolted down.
- The septic tank inspection pipe shall have a watertight cover (i.e. a screw-on lid).
- The sewage connection pipe exiting the structure shall be either strapped to a vertical supporting component of the structure or embedded in the foundation to protect the pipe from flood damage.

All operations and maintenance activities will be responsibility of King Nangara lodge Management. When the tank is full the management should engage an experienced contractor to evaluate if the tank needs to be pumped more or less often. Leaks occurring in the toilets and dripping faucets will be checked and repaired promptly. Soil around the treatment area should regularly check for wet or spongy soil around treatment area. Additionally, an alarm system can be installed to signal when there is a problem.

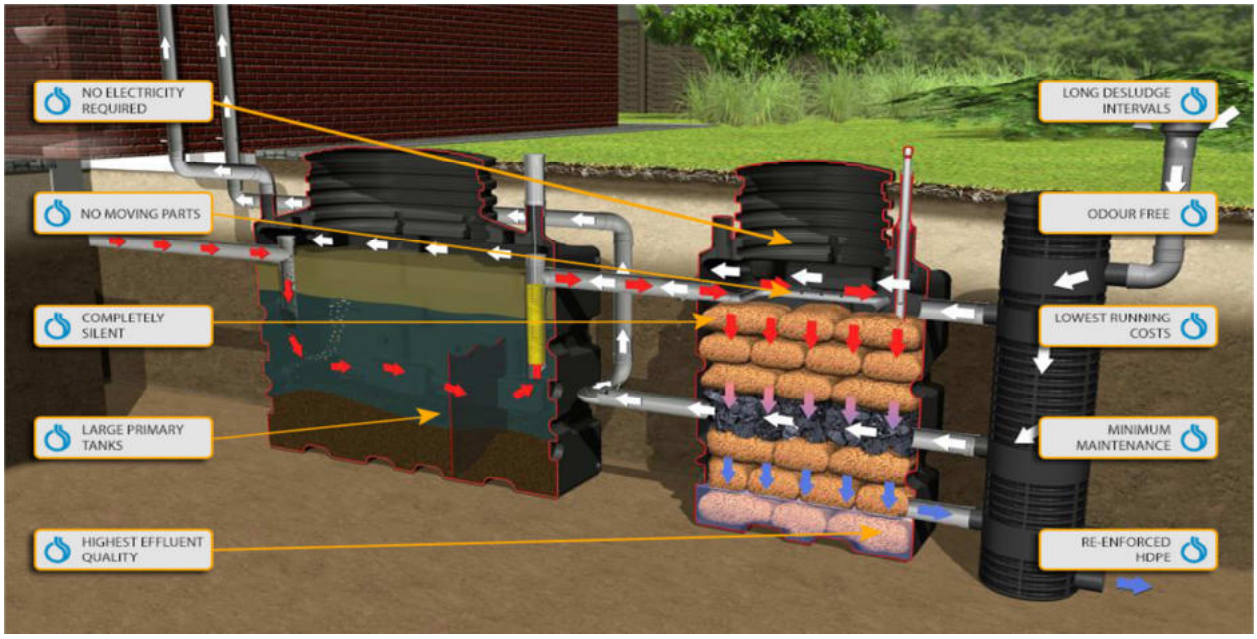

Figure 4: Poly Biorock sewerage system flow diagram, source: Biorock Syatems inc, 2014

7 Chapter Seven: Conclusion and Recommendations

The environmental impact assessment process for the proposed King Nangara Lodge at Shitemo Village was overally conducted in accordance to the Environmental Management Act 2007 and EMA Regulation 2012. Further consideration was given to relevant legislations such as Forest Act 2001, were also considered throughout the entire process to ensure a successful assessment process. Impacts likely to occur during project phases (construction, operation and decommission) were assessed depicting a positive outlook despite limited details of the magnitude of the lodge. Based on the assessment, the overall project is less damaging to the environment demonstrating highly job creation opportunities and community development. Impacts with negative effect were also identified and summarized in a form of environmental management plan to ensure sustainable implementation.

Furthermore, licences to erect building structures with 100m proximity from the river and vegetation clearing should be obtained from the directorate of forestry before the project commenced. Available protected trees such as Digitatia eriantha, Acacia erioloba, colophosperum mopane and peltophorum africanum and existing wildlife should be protected and conserved in order to maintain sustainable use of the environment. The proponent should refrain from indiscriminate clearing of vegetation which may lead to loss of habitat for birds etc. The factor of the locality's seasonal flooding should be considered in the lodge design construction and operation. Improved accessibility approach should be implemented to ensure smooth access during rainy season. It is important that the proponent observe and maintain accountability both socio-economically and environmentally to the activities of the project that the project is harmonized with policy, regulations, administrative frameworks and social interface with the public as proposed in the EMP. Failure to observe these measures will significantly affect the local environment and lead to non-compliance. Therefore, implementation environmental protection measures should be executed in consultation with the Key stakeholders.

References

BirdLife International.2012.Important Bird Areas factsheet: Mahango Game Reserve and Kavango river (Online) URL. http://www.birdlife.org [21 July 2016]

Burke, A.2002.Present vegetation in the Kavango Region.EnviroScience:Namiba Scientific Society-Windhoek, Namibia

Enviro Dynamic.2014.Exploration Environmental Assessment Kavango East, Namibia

FAO, 1998. World reference base for soil resources. World Soil Resources Report, vol. 84. FAO, Rome.

Government of Namibia. 2008, Government Gazzette of the Republic of Namibia. Government notice No.1: Regulations for Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA)-Windhoek

IFC.2007. Stakeholder Engagement: A good practice handbook for companies doing business in emerging markets. IFC, Washington D.C

Mendelsohn,J., el Obeid, S.2003.A digest of information on key aspects of Kavango`s geography and sustainable development prospects. Research and Information Services of Namibia

Mendelsohn,J.,2009.Land use in Kavango:Past,present and future. RAISON (Research and Information Services of Namibia

MET (Ministry of Environment and Tourism). 2012. *Environmental Management Act no. 7 of 2007*. Windhoek: Directorate of Environmental Affairs, Ministry of Environment and Tourism

Ministry of Environment and Tourism (MET).2007. Discover Bwabwata national park (Online) URL.
http://www.namibiahc.org.uk/resources/content/park_brochures/Bwabwata%20National%20Park.pdf.[20 December 2016]

Ministry of Environment and Tourism (MET).2008. Bwabwata national park (Online) URL.http://www.met.gov.na/Documents/Bwabwata%20National%20park.pdf. [21, July 2016]

Ministry of Environment and Tourism (MET).2008. Bwabwata national park (Online) URL.http://www.met.gov.na/Documents/Bwabwata%20National%20park.pdf. [21, July 2016]

Ministry of land and Resettlement.2015. King Nangara Lodge Measurements: Application of leasehold land right for Mr. Michael Barner Rasmussen